Amal Mehrotra

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EDUCATION

Ph.D. in Chemical Engineering **May 2011**

University of South Carolina GPA: 3.97/4.00

Dissertation: Cycle Scheduling and Design of Pressure Swing Adsorption cycles for CO_2 capture from Flue gas

Advisor: Dr. James A. Ritter

- Invention disclosures being filed based on research findings
- Voted 'Best Graduate Student (Research): 2010-11' in Chemical Engineering by faculty
- One of the 15 graduate students at University of South Carolina to win the 'Annual Travel Grant': 2010

B.Tech in Chemical Engineering **August 2005**

Guru Gobind Singh Indraprastha University GPA: 86/100 with honors

- Awarded Gold medal and Dean's scholarship for academic excellence: 2001-05
- Received Undergraduate student fellowship by Indian Institute of Sciences (IISc), Bangalore: 2003-04

WORK EXPERIENCE

Post-Doctoral Research Associate **June 2011 – present**

Lawrence Berkeley National Laboratory / University of California, Berkeley

- Associated with Batteries for Advanced Transportation Technologies (BATT) program
- Devised systematic methodology (modeling and design of experiments) to quantify polarization losses at liquid electrolyte / single ion conductor interface
- Measured complete set of transport properties (Diffusion coefficient, transference number, conductivity, activity coefficient) for baseline electrolyte of BATT program
- Quantified tortuosity of composite Li ion battery electrodes

Graduate Research Assistant (Chemical Engineering) **August 2006 – May 2011**

University of South Carolina

Process Design: CO_2 removal

- Modeled Pressure swing adsorption (PSA) processes for CO_2 capture from flue gas
  - Developed high throughput (> 1800 L STP/hr/kg) multi-bed PSA cycles with purity and recovery > 90%
- Worked with NASA's Marshall Flight space center team and Vanderbilt University for developing a sorbent-based atmosphere revitalization (SBAR) system for new manned exploration vehicles

Cycle Scheduling

- Derived arithmetic models and graphical approaches for PSA cycle scheduling of single and multi-train systems
  - Led to numerous permutations of PSA cycle schedules along with an efficient cycle screening method for virtually any conceivable PSA process

Equilibrium Theory

- Developed novel Equilibrium Theory models for Heavy Reflux PSA cycles
  - Obtained analytical solutions for dual reflux PSA cycles resulting in quick estimation of range of process parameters for improved performance
  - Utilized dynamic wave theory to understand process modifications such as co-current and counter-current operation of heavy reflux step and the effect of incorporating a Recovery and Feed + Recycle step

Graduate Teaching Assistant (Chemical Engineering) **August 2006 – May 2011**

University of South Carolina

- Developed novel evaluation methodologies for Unit Operations Laboratory reports which led to better student-instructor feedback mechanism and improved grades of 35% of class
- Mentored approximately 100 undergraduate students on Aspen-based design projects
- Served as a grader for Unit Operations Laboratory, Process Safety and Advanced Separations

PUBLICATIONS

- Mehrotra A., A.D. Ebner, and J.A. Ritter, "Simplified Graphical Approach for Complex PSA cycle Scheduling," *Adsorption,* **2011**, 17, 337-345.

- Mehrotra A., A.D. Ebner, and J.A. Ritter, "Arithmetic Approach for Complex PSA cycle Scheduling," *Adsorption,* **2010**, 16, 113-126.
- Mehrotra A., A.D. Ebner, and J.A. Ritter, "Graphical Approach for complex PSA cycle scheduling," *Adsorption*, **2009**, 15, 406-421.
- Reynolds, S.P.; Mehrotra, A.; Ebner, A.D.; Ritter, J.A. Heavy reflux PSA Cycles for CO_2 Recovery from Flue Gas: Part I. Performance evaluation. *Adsorption,* **2008**, 14, 399-413.

TECHNICAL PRESENTATIONS

- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Design of Pressure Swing Adsorption Cycles for Carbon Dioxide Capture from Flue gas," AIChE 2010 Annual Meeting, Salt Lake City, UT, November 2010, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Simplified Graphical Approach for Complex PSA Cycle Scheduling," AIChE 2010 Annual Meeting, Salt Lake City, UT, November 2010, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Carbon Dioxide Capture by Pressure Swing Adsorption," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, April 2010, invited.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Pressure Swing Adsorption Technology for Post and Pre-combustion Carbon Dioxide Capture," 26th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, September, 2009, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Carbon Dioxide Capture by Pressure Swing Adsorption," AIChE Spring National Meeting, Tampa, FL, April 2009, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Complexity of Cycle Scheduling in Pressure Swing Adsorption Processes," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, April 2009, invited.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Complexity of Cycle Scheduling in Pressure Swing Adsorption Processes," AIChE Annual Meeting, Philadelphia, PA, November 2008, invited.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Pressure Swing Adsorption Cycles for Carbon Dioxide Capture," AIChE Annual Meeting, Philadelphia, PA, November 2008, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Pressure Swing Adsorption Technology for Carbon Dioxide Capture," 25th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, October 2008, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Equilibrium Theory Analysis for Counter-current and Co-current operation of Heavy Reflux Step," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, October 2008, invited.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Complexity of Cycle Sequencing in Pressure Swing Adsorption Processes," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, April 2008, invited.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Vacuum Swing Adsorption Cycles for Carbon Dioxide Capture from Flue and Stack Gases," AIChE Spring National Meeting, New Orleans, LA, April 2008, contributed.
- A.D. Ebner, A. Mehrotra, J. C. Knox, M. D. LeVan and J. A. Ritter, "Simulation of Unique Pressure Changing Steps and Situations in PSA Processes," AIChE 2007 Annual Meeting, Salt Lake City, UT, November 2007, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Extreme Configurations in Heavy Reflux PSA Cycles," AIChE 2007 Annual Meeting, Salt Lake City, UT, November 2007, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Novel Heavy Reflux Cycles in Pressure Swing Adsorption Processes," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, October 2007, invited.
- S. P. Reynolds, A. Mehrotra, A. D. Ebner and J. A. Ritter, "Novel Heavy Reflux Cycles in Pressure Swing Adsorption Processes," Fundamentals of Adsorption FOA9, Giardini Naxos, Italy, May 2007, contributed.
- A. Mehrotra, A. D. Ebner and J. A. Ritter, "Complexity of Cycle Scheduling in Pressure Swing Adsorption Processes," Process Science and Technology Center (PSTC) bi-annual meeting, University of Texas-Austin, April 2007, invited.